UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,885	02/17/2004	Hans Thomann	PM 2000.010A/4	9638

1473 7590 08/08/2006

FISH & NEAVE IP GROUP
ROPES & GRAY LLP
1251 AVENUE OF THE AMERICAS FL C3
NEW YORK, NY 10020-1105

EXAMINER	
TAYLOR, VICTOR J	
ART UNIT	**PAPER NUMBER**
2863	

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/779,885	THOMANN ET AL.	
	Examiner	Art Unit	
	Victor J. Taylor	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 January 2006*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 21 April 2005. These drawings are approved.

Response to Arguments

2. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Prior Art

3. The prior art made of record and not relied upon is considered pertinent to applicant:

4. Widrow, US 4,964,087 in class 367/45 is cited for the drill bit seismic source technique using sensors and the BHA for VSP modeling techniques see figure 1 and the abstract. See the entire patent and all elements of figure 16 and discloses vectors and gradient algorithms in lines 1-60 of column 14. He further discloses the use of the drill bit as a seismic source taught by Widrow in patents 4,363,112 and 4,365,322 as prior art in the background of the invention in lines 5-65 of column 1.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory matter and is drawn to a computation method for estimating formation properties and computation methods for estimating wellbore parameters with

computation methods for monitoring and optimizing pressure parameters and weight of drilling mud using drill bit seismic VSP methods for generating and detecting both compressional and shear waves with computation method steps for computing and estimating frequency characteristics and formation properties using the drill bit as a seismic signal source to determine the various formation properties and formation pore pressures which fail to show the clear concrete and tangible result or provide for output to the user.

For example;

Claim 1 provides computational method steps for estimating a formation property with method steps for generating and detecting a seismic compressional and shear wave generated by the noise source from a drill bit source signal from a BHA with computational method steps for detecting the signal from the BHA with computational steps for computing a frequency characteristic of the said signal wherein the characteristic is used to estimate a formation property that fails to show a storage media or outputted data on a display or similar device for output for a user and comprise computation processes that show no clear concrete tangible result.

For the result to be tangible it would need to output to a user or displayed to a user or stored on data media for later usage. Hence the claims are treated as non-statutory functional descriptive material (See MPEP Section 2106).

As to claims 2-19 and 23-24 are based on the rejected base claim 1 and are rejected at least for the reasons cited above. And,

Claim 20 provides computational processes steps for estimating a formation pore pressure with method steps for generating a source signal from the BHA noise source and detecting receiver signals from the BHA noise source with method computational steps for using the source signal and receiver signals to estimate the pore pressure on the formation that are based on computation methods steps processes that show no clear concrete tangible result.

For the result to be tangible it would need to output to a user or displayed to a user or stored on data media for later usage. Hence the claims are treated as non-statutory functional descriptive material (See MPEP Section 2106). And,

Claim 21 provides for computational processes for monitoring the well bore pressure with computation method steps for generating a source signal and detecting a the generated source signal from the BHA using a receiver with computational steps for determining pore pressure with computation steps for internal repeating the computational computer processes with steps for using which comprise abstract computation steps with no clear concrete tangible result.

For the result to be tangible it would need to output to a user or displayed to a user or stored on data media for later usage. Hence the claims are treated as non-statutory functional descriptive material (See MPEP Section 2106). And,

Claim 22 provides for computational processes for optimizing the well bore pressure with computation method steps for generating a source signal and detecting a the generated source signal from the BHA using a receiver with computational steps for determining pore pressure with computation steps for internal repeating the

computational computer processes with steps for using which comprise abstract computation steps with no clear concrete tangible result.

For the result to be tangible it would need to output to a user or displayed to a user or stored on data media for later usage. Hence the claims are treated as non-statutory functional descriptive material (See MPEP Section 2106).

See MPEP 2106 and United States Patent and Trademark Office Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility **OG Notices: 22 November 2005** and the 101 issues as found in the inter-net location, http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Widrow in US Patent 4,849,945.

With regard to claim 1, Fowler discloses VSP and the drill bit seismic source 13 and adaptive filters 26 and filter 20 used to measure and calculate seismic velocities from reflection coefficients using the equipment in figure 1 and discloses ratios and seismic velocities in lines 20-35 of column 7.

He further discloses the limitations for,

a. Generating a source signal from the BHA and generates a seismic noise wave 12 in figure 1 and in figure 12 and discloses the plurality of waves generated by the bit on the bore bottom in lines 20-25 of column 20. And discloses,

b. Steps for detecting a wave received signal using the bottom hole assembly bit source and using the sensor a and sensor b in figure 1 and seismic sensors adapted to receive seismic data including wave data generated by the drill bit borehole seismic source in lines 5-20 of column 2. And discloses,

c. Steps for computing a frequency dependent characteristic of at least one receiver signal wherein the frequency spectrum of seismic signals generated at point c of figure 1 in line 45 of column generates the speed of propagation of the seismic energy in line 65 of column 17 contains the frequency spectrum where (w) omega is equal to 2 phi time the stated frequency of interest used to compute rock formation properties of interest using equation 55a and equation 55b in lines 1-45 of column 19. And,

d. Using the frequency dependent characteristic to estimate the formation property from drill bit vibrations in line 39 of column 19 wherein the shear waves and compressional waves in lines 5-10 of column 20 produce differences in reflection coefficient and give information about formation properties in line 10 of column 20 in combination with the drill bit 12 and measuring apparatus 10 in figure 1.

As to claim 2, Fowler discloses the BHA 12 is a portion of the MWD logging device 10 in figure 1

<u>As to claim 3</u>, Fowler discloses the source signal 12 is a noise source in the abstract and discloses seismic multipath modeling of noise in figure 1 and in lines 40-55 of column 7.

<u>As to claim 4</u>, Fowler discloses the steps wherein computing the frequency dependent characteristic uses the cross correlation analysis 18 in line 35 of column 11.

<u>As to claim 5</u>, Fowler discloses the steps wherein the noise source 12 provides a direct signal to the sensor through the borehole into the formation surrounding the borehole in figure 9

<u>As to claim 6</u>, Fowler discloses the steps wherein at least one signal is a reflected signal 130 in figure 16.

<u>As to claim 7</u>, Fowler discloses the steps wherein the characteristic is attenuation detailed in the drop of the first power in line 10 of column 12.

<u>As to claim 8</u>, Fowler discloses the steps wherein the formation property is pore pressure disclosed in the complete information about the subterranean geological formations in line 50 of column 2 including the pore pressure abound other formation parameters.

<u>As to claim 9</u>, Fowler discloses the steps wherein computations include frequency dependent attenuation relationship using the filters 26 in figure 1 and in lines 25-45 of column 15.

<u>As to claim 10</u>, Fowler discloses the steps wherein the wave velocity is disclosed in line 65 of column 17 from the drill bit 12 in line 67.

As to claim 11, Fowler discloses the steps wherein the formation property is pore pressure disclosed in the complete information about the subterranean geological formations in line 50 of column 2 including the pore pressure abound other formation parameters.

As to claim 12, Fowler discloses the steps wherein the lithology of the formation includes stratigraphic layers reflection coefficient and hardness among other properties of the formation in lines 50-59 of column 1.

As to claim 13, Fowler discloses the steps wherein the property includes fluid content in line 53 of column 1.

As to claim 14, Fowler discloses the steps wherein the property is rock strength disclosed in the hardness and various properties of the formation in line 57 of column 1.

As to claim 15, Fowler discloses the steps wherein the BHA 12 is a portion of the MWD logging device 10 in figure 1.

As to claim 16, Fowler discloses the steps wherein the drill bit seismic source 12 is the active source on the BHA.

As to claim 17, Fowler discloses the steps wherein computing the frequency dependent characteristic uses the frequency component analysis using cross correlation analysis techniques 18 in line 35 of column 11.

As to claim 18, Fowler discloses the steps wherein a plurality of receivers provides a direct signal to the sensor from the source through the borehole into the formation surrounding the borehole in figure 9

As to claim 19, Fowler discloses the steps wherein the formation property is permeability disclosed in the hardness and various properties of the formation in line 57 of column 1.

With regard to claim 20, Fowler discloses VSP used to measure and estimate calculate seismic properties that can include pore pressure from reflection coefficients in lines 20-35 of column 7.

He further discloses the limitations for,

a. Generating a source signal from the BHA wherein the source signal is a noise spectrum generated by a drill bit 12 in figure 1 and generates a seismic noise wave 12 in figure 1 and discloses the plurality of noise waves generated by the drill bit on the BHA in lines 20-25 of column 20. And discloses,

b. Steps for detecting a plurality of received signals using the bottom hole assembly bit source and the sensor (a) and sensor (b) in figure 1 and in lines 5-20 of column 2. And discloses,

c. Steps for using the source signal 12 and receiver signal 22 in figure 1 to estimate a formation property (the pore-pressure) from at least one formation in lines 50-60 of column 1 by computing a frequency dependent characteristic of receiver signals using the stated frequency of interest to compute the rock formation properties of interest with equation 55a and equation 55b in lines 1-45 of column 19. And,

d. Repeating steps a, b, and c during the VSP with the BHA drill bit 12 and measuring apparatus 10 in figure 1.

With regard to claim 21, Fowler steps of monitoring parameters of the wellbore and estimate calculate properties including wellbore safety margins using the BHA precise focusing feature in line 20 of column 25.

He further discloses the limitations for,

a. Generating a source signal from the BHA and generates a seismic noise wave 12 in figure 1 wherein the source signal is a noise spectrum generated by a drill bit 12 in figure 1 and in lines 20-25 of column 20. And discloses,

b. Steps for detecting a plurality of received signals using the bottom hole assembly bit source and the sensor (a) and sensor (b) in figure 1 in lines 5-20 of column 2. And discloses,

c. Steps for using the source signal 12 and receiver signal 22 in figure 1 to estimate a formation property (the pore-pressure) from at least one formation in lines 50-60 of column 1, by computing a frequency dependent characteristic of receiver signals using the stated frequency of interest to compute the rock formation properties of interest with equation 55a and equation 55b in lines 1-45 of column 19. And,

d. Using the borehole parameters (pore pressure) to monitor the wellbore parameters (pressures and other well parameters) at any drilling depth in lines 20-27 of column 19.

e. Repeating steps a, b, and c during the VSP with the drill bit 12 and measuring apparatus 10 in figure 1.

With regard to claim 22, Fowler discloses steps for used to measure and estimate calculate seismic properties that can include parameters of drilling lubricant computed from reflection coefficients in lines 20-35 of column 7.

He further discloses the limitations for,

a. Generating a source signal from the BHA and generates a seismic noise wave 12 in figure 1 wherein the source signal is a noise spectrum generated by a drill bit 12 in figure 1 and discloses the plurality of noise waves generated by the bit on the bore bottom in lines 20-25 of column 20. And discloses,

b. Steps for detecting a plurality of received signals using the bottom hole assembly bit source with the sensor a and sensor b in figure 1 adapted to receive seismic signals generated by the drill bit borehole seismic source in lines 5-20 of column 2. And discloses,

c. Steps for using the source signal 12 and receiver signal 22 in figure 1 to estimate a formation property (the pore-pressure) from a formation in lines 50-60 of column 1. And,

d. Using the borehole parameters (pore pressure) to monitor the wellbore parameters (pressures and other well parameters) at any drilling depth in lines 20-27 of column 19.

As to claim 23-24, Fowler discloses the steps wherein the estimating is based on single value characteristic and a plurality of evaluations in the multiply computed expressions from a plurality of signals in lines 5-50 of column 19.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor J. Taylor whose telephone number is 571-272-2281. The examiner can normally be reached on 8:00 to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571-272-2863. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Victor J. Taylor
Examiner
Art Unit 2863

22 July 2006.

JBarlow
John Barlow
Supervisory Patent Examiner
Technology Center 2800